

REMARKS

INTRODUCTION:

In accordance with the foregoing, claims 1 and 4 have been amended. No new matter is being presented, and approval and entry are respectfully requested.

Claims 1-7 are pending and under consideration. Reconsideration is requested.

INTERVIEW SUMMARY:

On September 6, 2006, Applicants' representative, Michael Bush, Examiner Krause, and Supervisor Fenstermacher discussed the cited art with respect to the claims. Participants reached agreement that, substantively, the claims distinguish over the cited art. Arguments are set forth in more detail below in the section regarding the §§102 and 103 rejections.

Applicants thank the Examiner and Supervisor for the helpful suggestions regarding the amendment of claim 1.

REJECTION UNDER 35 U.S.C. §112:

In the Office Action, at page 2, item 2, the Examiner rejected claim 4 under 35 U.S.C. §112, second paragraph, as being indefinite. The reasons for the rejection are set forth in the Office Action and therefore not repeated. Applicants traverse this rejection and respectfully request reconsideration.

Applicants respectfully submit that the amendment of claim 4 overcomes the Examiner's rejection.

REJECTION UNDER 35 U.S.C. §§102 and 103:

In the Office Action, at page 2, item 4, the Examiner rejected claims 1, 2, and 4-7 under 35 U.S.C. §102(b) as being anticipated by Mutou et al (U.S. 6,074,099 – hereinafter Mutou). The reasons for the rejection are set forth in the Office Action and therefore not repeated. Applicants traverse this rejection and respectfully request reconsideration.

In the Office Action, at page 4, item 6, the Examiner rejected claim 3 under 35 U.S.C. §103(a) as being unpatentable over Mutou in view of Yamamoto et al. (U.S. 2003/0012471 – hereinafter Yamamoto). The reasons for the rejection are set forth in the Office Action and

therefore not repeated. Applicants traverse this rejection and respectfully request reconsideration.

Amended, independent claim 1 recites: "...wherein radial sides of an inner surface of each of the pockets that are opposite to each other in a radial direction of the ball retainer are defined as spherical ball bearing surfaces to which each ball contacts; wherein intermediate portions of the inner surface of each pocket with respect to the radial direction are defined as circumferential non-contact surface areas that the corresponding ball is prevented from contacting; and wherein substantially all edges of the ball bearing surfaces of the inner surface of each pocket, which contact the ball, are chamfered edges."

Independent claim 6 recites: "...each pocket comprising opposing fore and aft portions with respect to the circumferential direction, and a lubricant reservoir groove disposed between the fore and aft portions and axially opposite an axial opening of the pocket; each of the fore and aft portions comprising a pair of ball bearing surfaces disposed at inner and outer radial edges of an internal surface of the pocket, a non-contact surface area disposed between the ball bearing surfaces, and offset from the ball bearing surfaces, such that the corresponding ball is prevented from contacting the non-contact surface area, and a radially disposed intersecting lubricant reservoir groove, intersecting the ball bearing surfaces and the non-contact surface area, wherein substantially all edges of the ball bearing surfaces are chamfered, and a radial thickness of a portion of the retainer body adjacent each ball bearing surface is greater than a radial thickness of a portion of the retainer body disposed axially outward of the lubricant reservoir groove and circumferentially between adjacent pockets."

And independent claim 7 recites: "...opposing pocket surface portions, disposed on the retainer body fore and aft of each pocket with respect to the direction of travel; and each pocket surface portion comprising a pair of ball bearing surfaces disposed at inner and outer radial edges of the pocket surface portion, a non-contact surface area disposed between the ball bearing surfaces, and offset from the ball bearing surfaces, such that the corresponding ball is prevented from contacting the non-contact surface area when the ball contacts the pocket surface portion...wherein substantially all edges of the ball bearing surfaces are chamfered."

Mutou discloses cages 11a for ball bearings, in which resilient pieces 13 extend from annular main portion 12, and define pockets 7 therebetween, to receive balls 5. The pockets 7 have a spherical surface portion 15 provided generally along the entire length of the pocket 7,

that functions as a hold and guide (i.e., bearing) surface for balls 5. The pockets 7 also have cylindrical surface portions 16 positioned at the radially inner side, the radially outer side, or both. (See Mutou, at FIGS. 1, 2, 4-7, 11, and 12, and col. 6, lines 37-65).

In Mutou, the "rolling contact surface of the balls 5 may come into contact with the spherical surface portion 15, but not with the cylindrical surface portions 16." (Mutou, col. 6, line 67 to col. 7, line 3).

In contrast, by way of a non-limiting embodiment of the subject application, ball bearing surface areas 5 are disposed at axially outer sides of pockets 3, and non-contact surface areas 6 are disposed radially in between the ball bearing surfaces 5. (See Specification, e.g., at FIG. 1).

Applicants respectfully submit that, contrary to the Examiner's assertions, grooves 20 of Mutou extend radially through the pocket 7 (see FIG. 11), and thus, are not an intermediate portion of the inner surface of each pocket with respect to the radial direction.

Further, contrary to the Examiner's assertion, Applicants respectfully submit that cylindrical surface portion 16 and wedge shaped clearances 17 are not ball bearing surfaces. In fact, as noted above, Mutou states that balls 5 may not contact cylindrical surface portion 16. (See Mutou, at col. 6, line 67 to col. 7, line 3).

Yet further, with respect to independent claim 6, in rejecting claim 3, the Examiner admits that Mutou does not disclose that a bottom of the inner surface of each pocket is formed with a bottom oil reservoir groove of a generally concave shape. Thus, Applicants respectfully submit that Mutou neither discloses nor suggests "...a lubricant reservoir groove disposed between the fore and aft portions and axially opposite an axial opening of the pocket...."

Additionally, with respect to independent claims 6 and 7, and claim 2, the Examiner asserts that grooves 20 of Mutou correspond both to the claimed non-contact surface area and to the claimed intersecting lubricant reservoir groove. Applicants respectfully disagree with the Examiner's interpretation, particularly since the groove 20 of Mutou cannot intersect with itself.

And regarding claim 4, as shown in FIGS. 2, 5, 7, and 12 of Mutou, the radial thickness of annular main portion 12 adjacent pockets 7 is no different from the radial thickness of annular main portion 12 at positions other than adjacent to pockets 7. In other words, the radial thickness

of annular main portion 12 is the same throughout, both at positions adjacent to pockets 7 and at positions that are not adjacent to pockets 7.

In Mutou, since the ball 5 contacts with spherical surface portion 15, it is difficult to supply the lubricant between the spherical surface portion 15 and the ball 5. As a result, smooth rotation of ball five is difficult to attain. Further, in the ball retainer disclosed in Mutou, the spherical surface portion 15 has a radius of curvature slightly larger than the radius of the rolling contact surface of ball 5. As a result ball 5 tends to press against a rear region on the spherical surface portion 15 with respect to the direction of rotation. Such pressing increases the likelihood of fretting, since ball 5 rolls with a point contact with the spherical surface portion 15. Further still, free movement of the ball 5 in a circumferential direction within pocket 7 causes a vibration of ball 5, and therefore vibration of the retainer 6.

Applicants respectfully submit that Mutou fails to disclose every element of the claims, arranged as required by the claims.

Accordingly, Applicants respectfully submit that the Examiner has not provided sufficient evidence to maintain a prima facie anticipation rejection of claims 1, 2, and 4-7.

Regarding the §103 rejection of claim 3, which depends from independent claim 1, Applicants respectfully note that the Examiner indicated that the document number for Yamamoto was U.S. 2003/0012461, but U.S. 2003/0012461 is a publication by Satoh, Masao; et al., entitled "Imaging apparatus and an imaging head used therefore." Accordingly, Applicants have assumed that the recitation of document number U.S. 2003/0012461 was merely a typographical error, and that the Examiner intended to indicate that the document number for Yamamoto was U.S. 2003/0012471, as cited in the Office Action mailed October 31, 2005.

And as noted in the section regarding the rejections under 35 U.S.C. §102, Applicants respectfully submit that Mutou fails to disclose every element of independent claim 1, arranged as required by independent claim 1.

Applicants respectfully submit that Yamamoto fails to cure these defects.

Accordingly, Applicants respectfully submit that independent claims 1, 6, and 7 patentably distinguish over the cited art, and should be allowable for at least the above-mentioned reasons. Further, Applicants respectfully submit that claims 2-4, and 5, which depend

from independent claim 1, should be allowable for at least the same reasons as claim 1, as well as for the additional features recited therein.

CONCLUSION:

In accordance with the foregoing, Applicants respectfully submit that all outstanding objections and rejections have been overcome and/or rendered moot, and further, that all pending claims patentably distinguish over the cited art. Thus, there being no further outstanding objections or rejections, the application is submitted as being in condition for allowance which action is earnestly solicited.

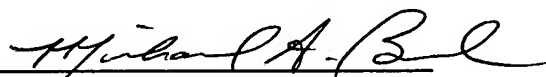
If the Examiner has any remaining issues to be addressed, it is believed that prosecution can be expedited and possibly concluded by the Examiner contacting the undersigned attorney for a telephone interview to discuss any such remaining issues.

If there are any underpayments or overpayments of fees associated with the filing of this Amendment, please charge and/or credit the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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